

SEQUENCE LISTING

<110> The Regents of the University of California

<120> HY2 FAMILY OF BILIN REDUCTASES

<130> 407T-907730pc

<140> PCT/US01/18326

<141> 2001-06-05

<150> 09/870,406

<151> 2001-05-29

<150> 60/271,758

<151> 2001-02-26

<150> 60/210,286

<151> 2000-06-08

<160> 57

<170> PatentIn version 3.0

<210> 1

<211> 30

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 1

acagcgagat tcaaaggtcc attaaccgga

30

<210> 2

<211> 30

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 2

gggcttacag tgatatctgc aagacttcta

30

<210> 3

<211> 20

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 3

taatgcttgc gacaaacagg

20

<210> 4
 <211> 20
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 4
 gttcatctca gggccaaaaa 20

 <210> 5
 <211> 22
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 5
 gctttcagaa atcagacctc aa 22

 <210> 6
 <211> 21
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 6
 ctggtgtggt tgategaatc t 21

 <210> 7
 <211> 20
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 7
 ctgccaaagct tcatttggtt 20

 <210> 8
 <211> 20
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 8
 gcaggagctg cagacaatct 20

<210>	9	
<211>	22	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	9	
	caatgcaggt ttaacttcag ca	22
<210>	10	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	10	
	ccatgggaaa gtctgcaa	20
<210>	11	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	11	
	tcaagccctt ttccaacatc	20
<210>	12	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	12	
	ttccccatct gaactcaacc	20
<210>	13	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	13	
	aatgatgcat ggtggtggtg	20

<210>	14	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	14	
	gctcgaggaa aagtcaccca	20
<210>	15	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	15	
	cgtttgcctc actgaaactg	20
<210>	16	
<211>	20	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	16	
	caatcatctt gaaatgcaga	20
<210>	17	
<211>	30	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	17	
	gaagatctgt ctctgctgtg tcgtataagg	30
<210>	18	
<211>	36	
<212>	DNA	
<213>	Artificial	
<220>		
<223>	Primer	
<400>	18	
	tccccgggt tagccgataa attgtcctgt taaatc	36

<210> 19
 <211> 28
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 19
 aaggatccat ggccgtcact gatttaag 28

 <210> 20
 <211> 36
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 20
 acgcgtcgac tattattgga taacatcaaa taagac 36

 <210> 21
 <211> 29
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 21
 ggaattcatc ttgattcat ttctcaatg 29

 <210> 22
 <211> 36
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 22
 atagttagcg gccgctcatt tgtgagagga ggaggc 36

 <210> 23
 <211> 31
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 23
 ggaattcatc acaaataaaa gattcaaaag c 31

<210> 24
 <211> 40
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 24
 atagtttagcg gccgcttata gatcaaaaag cacagtgtgg 40

 <210> 25
 <211> 30
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 25
 ggaattcatc tcacttactt ccattccctc 30

 <210> 26
 <211> 37
 <212> DNA
 <213> Artificial

 <220>
 <223> Primer

 <400> 26
 atagtttagcg gccgcttatt ctgggagatc aaataac 37

 <210> 27
 <211> 3997
 <212> DNA
 <213> Artificial

 <220>
 <223> Plsmid pPROLarA122/H01-RBS-SLR0116.

 <400> 27
 cagaattcat taaagaggag aaaggtacca tgagtgtcaa cttagcttcc cagttgcggg 60
 aagggacgaa aaaatcccac tccatggcgg agaacgtcgg ctttgtcaaa tgcttctca 120
 agggcgttgt cgagaaaaat tcctaccgta agctgggttg caatctctac tttgtctaca 180
 gtgccatgga agaggaaatg gcaaaattta aggaccatcc catcctcagc cacatttact 240
 tccccgaact caaccgcaaa caaagcctag agcaagacct gcaattctat tacgggtcca 300
 actggcggca agaagtga aaattctgcc ctggccaagc ctatgtggac cgagtcgggc 360
 aagtggccgc tacggcccct gaattgttgg tggcccatc ctacaccgt tacctggggg 420
 atctttccgg cgggtcaaatt ctcaagaaaa ttgcccaaaa tgccatgaat ctccacgatg 480

gtggcacagc tttctatgaa tttgccgaca ttgatgacga aaaggctttt aaaaatacct	540
accgtcaagc tatgaatgat ctgcccattg accaagccac cgccgaacgg attgtggatg	600
aagccaatga cgcttttgcc atgaacatga aaatgttcaa cgaacttgaa ggcaacctga	660
tcaaggcgat cggcattatg gtgttcaaca gcctcaccgc tcgccgcagt caaggcagca	720
ccgaagttgg cctcgccacc tccgaaggct agttaagag gagaaaggat ccatggccgt	780
caactgattta agtttgacca attcttcctt gatgcctacg ttgaaccgca tgattcaaca	840
gttgccctg gcgatcgccg ctagttggca aagtttacc ctaagccct atcaattgcc	900
ggaggatttg ggctacgtag aaggccgcct ggaaggggaa aagttagtga ttgaaaatcg	960
gtgctaccaa acgccccagt ttcgcaaaat gcatttggag ttggccaagg tgggcaaagg	1020
gttgatatt ctccactgtg taatgtttcc tgagccttta tacggtctac ctttgtttgg	1080
ctgtgacatt gtggccggcc ccggtggagt aagtgcggct attgcggatc tatccccac	1140
ccaaagcgat cgccaattgc ccgcagcgta ccaaaaatca ttggcagagc taggccagcc	1200
agaatttgag caacaacggg aattgcccc ctggggagaa atattttctg aatattgttt	1260
attcatccgt ccagcaatg tcaactgaaga agaaagattt gtacaaaggg tagtggactt	1320
tttgcaaatt cattgtcacc aatccatcgt tgccgaacc ttgtctgaag ctcaaacttt	1380
ggagcacctg caggggcaaa ttcattactg ccaacaacaa cagaaaaatg ataaaaccg	1440
tcgggtactg gaaaaagctt ttggggaagc ttggggcgaa cggtatatga gccaaagtctt	1500
atttgatgtt atccaataat ctagaggcat caaataaaac gaaaggctca gtcgaaagac	1560
tgggccttgc gttttatctg ttgtttgtcg gtgaacgctc tcctgagtag gacaaatccg	1620
ccgccctaga cctaggggat atattccgct tcctcgctca ctgactcgct acgctcggtc	1680
gttcgactgc ggcgagcgga aatggcttac gaacggggcg gagatttcct ggaagatgcc	1740
aggaagatac ttaacagggg agtgagaggg ccgcggcaaa gccgttttgc cataggctcc	1800
gccccctga caagcatcac gaaatctgac gctcaaatca gtggtggcga aacccgacag	1860
gactataaag ataccaggcg tttccccctg gcggctccct cgtgcgctct cctgttctg	1920
cctttcggtt taccggtgtc attccgctgt tatggccgcg tttgtctcat tccacgcctg	1980
acactcagtt ccgggtaggc agttcgctcc aagctggact gtatgcacga accccccgtt	2040
cagtccgacc gctgcgcctt atccggtaac tatcgtcttg agtccaaccc ggaaagacat	2100
gcaaaagcac cactggcagc agccactggg aattgattta gaggagttag tcttgaagtc	2160
atgcgccggt taaggctaaa ctgaaaggac aagttttggt gactgcgctc ctccaagcca	2220
gttacctcgg ttcaaagagt tggtagctca gagaaccttc gaaaaaccgc cctgcaaggc	2280

ggttttttcg	ttttcagagc	aagagattac	gcgagacca	aaacgatctc	aagaagatca	2340
tcttattaat	cagataaaat	attactagat	ttcagtgcaa	tttatctctt	caaagttagc	2400
acctgaagtc	agccccatac	gatataagtt	gttactagt	cttggattct	caccaataaa	2460
aaacgcccgg	cggcaaccga	gcgttctgaa	caaattccaga	tggagttctg	aggtcattac	2520
tggatctatc	aacaggagtc	caagcgagct	ctcgaacccc	agagtcccg	tcagaagaac	2580
togtcaagaa	ggcgatagaa	ggcgatgcgc	tgcgaatcgg	gagcggcgat	accgtaaagc	2640
acgaggaagc	ggtcagccca	ttcgccgcca	agctcttcag	caatatcacg	ggtagccaac	2700
gctatgtcct	gatagcggtc	cgccacaccc	agccggccac	agtcgatgaa	tccagaaaag	2760
cggccatttt	ccaccatgat	attcggcaag	caggcatcgc	catgggtcac	gacgagatcc	2820
tgcgcgtcgg	gcattgcgcgc	cttgagcctg	gcgaacagtt	cggctggcgc	gagcccctga	2880
tgtcttctgt	ccagatcatc	ctgatcgaca	agaccggctt	ccatccgagt	acgtgctcgc	2940
togatgcgat	gtttcgcttg	gtggtcgaat	gggcaggtag	ccggatcaag	cgtatgcagc	3000
cgcgcgattg	catcagccat	gatggatact	ttctcggcag	gagcaagggtg	agatgacagg	3060
agatcctgcc	ccggcacttc	gccaatagc	agccagtcct	ttcccgtctc	agtgacaacg	3120
tgcagcacag	ctgcgcaagg	aacgcccgtc	gtggccagcc	acgatagccg	cgctgcctcg	3180
tcctgcagtt	cattcagggc	accggacagg	tcggtcttga	caaaaagaac	cgggcgcccc	3240
tgcgctgaca	gccggaacac	ggcggcatca	gagcagccga	ttgtctgttg	tgcccagtca	3300
tagccgaata	gcctctccac	ccaagcggcc	ggagaacctg	cgtgcaatcc	atcttgttca	3360
atcatgcgaa	acgatcctca	tcctgtctct	tgatcagatc	ttgatcccct	gcgccatcag	3420
atccttggcg	gcaagaaagc	catccagttt	actttgcagg	gcttcccaac	cttaccagag	3480
ggcgccccag	ctggcaattc	cgacgtctgt	gtggaattgt	gagcggataa	caatttcaca	3540
cagggccctc	ggacaccgag	gagaatgtca	agaggcgaac	acacaacgtc	ttggagcgcc	3600
agaggaggaa	cgagctaaaa	cggagctttt	ttgccctgcg	tgaccagatc	ccggagttgg	3660
aaaacaatga	aaaggccccc	aaggtagtta	tccttaaaaa	agccacagca	tacatcctgt	3720
ccgtccaagc	agaggagcaa	aagctcattt	ctgaagagga	cttggtgcgg	aaacgacgag	3780
aacagttgaa	acacaaactt	gaacagctac	ggaactcttg	tgcgtaagga	aaagtaagga	3840
aaacgattcc	ttctaacaga	aatgtcctga	gcaatcacct	atgaactgtc	gactcgagca	3900
tagcattttt	atccataaga	ttagcggatc	taacctttac	aattgtgagc	gctcacaatt	3960
atgatagatt	caattgtgag	cggataacaa	tttcaca			3997

<210> 28
<211> 29
<212> DNA
<213> Artificial

<220>
<223> Primer

<400> 28
atcgggtacca tgagtgtcaa cttagcttc

29

<210> 29
<211> 43
<212> DNA
<213> Artificial

<220>
<223> Primer

<400> 29
attggatcct ttctcctctt taactagcct tcggaggtgg cga

43

<210> 30
<211> 23
<212> DNA
<213> Artificial

<220>
<223> Primer

<400> 30
cggatatcat gtcccctata cta

23

<210> 31
<211> 28
<212> DNA
<213> Artificial

<220>
<223> Primer

<400> 31
gcgcggccgc ttagccgata aattgtcc

28

<210> 32
<211> 2160
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (248)..(469)

<220>
<221> CDS
<222> (653)..(769)

```

<220>
<221> CDS
<222> (852)..(947)

<220>
<221> CDS
<222> (1034)..(1126)

<220>
<221> CDS
<222> (1213)..(1344)

<220>
<221> CDS
<222> (1419)..(1523)

<220>
<221> CDS
<222> (1612)..(1662)

<220>
<221> CDS
<222> (1743)..(1913)

<400> 32
gaattcccca cgtcaacgtg actgtgcatt ccacgtggcg gatgtggggc ctatagttgg 60
accatgactc ggacggatgt tgaaattcat tgtcgttgcc aattgcgttt gtctcactga 120
aactgtgaaa attttatctc ttttatagat aaagaatctt gcttttttca gttttcagta 180
tgaagaagaa ttgaagagag tgtccgagga aggagacctt tggtttcagt ttgtgagtct 240
tgttgta atg gct tta tca atg gag ttt ggg ttt tca att ggg tca tgc 289
      Met Ala Leu Ser Met Glu Phe Gly Phe Ser Ile Gly Ser Cys
        1                5                10

ttc aag gca cca aac cca cct gtt cta atc tct gca agc cct aat aag 337
Phe Lys Ala Pro Asn Pro Pro Val Leu Ile Ser Ala Ser Pro Asn Lys
15                20                25                30

atc aat ttc acg ttg aga agg aga aag aaa aga ttc tta ctt aga gtc 385
Ile Asn Phe Thr Leu Arg Arg Arg Lys Lys Arg Phe Leu Leu Arg Val
        35                40                45

tct gct gtg tcg tat aag gaa ttc gca gag tct gct tta gaa gaa acc 433
Ser Ala Val Ser Tyr Lys Glu Phe Ala Glu Ser Ala Leu Glu Glu Thr
        50                55                60

agg aaa agg atc gtt ctt gaa cct tca cat ctc cag gtatatgcaa 479
Arg Lys Arg Ile Val Leu Glu Pro Ser His Leu Gln
        65                70

ttacatttcg ttagtgtagt gggaggatta tattttctcat tgtttcttgc tgtgaatttt 539
gggtaaattg atttgagttg tcattaggaa ccaaacaat aactttactg ttatagactg 599
cttatataag taaaagttca gattttgttt ttctaatacac gaaactgttt cag gaa 655
                                Glu

```

aag tat agt agc atg aca gga cta gat ggt aag acc gaa ctt caa atg Lys Tyr Ser Ser Met Thr Gly Leu Asp Gly Lys Thr Glu Leu Gln Met 80 85 90	703
ctt gct ttt aaa tct tca aag att aga ctc ttg agg agt atg gca ata Leu Ala Phe Lys Ser Ser Lys Ile Arg Leu Leu Arg Ser Met Ala Ile 95 100 105	751
gag aat gag aca atg cag gtttaacttc agcagtacaa actgattgct Glu Asn Glu Thr Met Gln 110	799
ttagtcccat ttccttactt tcaattgatt gattgtttgt atcttcgctt ag gtc ttt Val Phe 115	857
gac ttt gcg ggt ttc atg gag cct gag tat gat act ccc ata ttc tgt Asp Phe Ala Gly Phe Met Glu Pro Glu Tyr Asp Thr Pro Ile Phe Cys 120 125 130	905
gct aac ttt ttc aca tct acc aac gtt aac ata gtt gta ttg Ala Asn Phe Phe Thr Ser Thr Asn Val Asn Ile Val Val Leu 135 140 145	947
taagttatct tctagttatg ctggagttat caggtctgta ttgtccaaac tgatgttcaa	1007
tattttactg tatgtttcttc tttagg gac ctt aat cct ttg cat cag ttg act Asp Leu Asn Pro Leu His Gln Leu Thr 150	1060
gac cag acg gat tac caa gac aag tat tat aac aag ata atg tcc ata Asp Gln Thr Asp Tyr Gln Asp Lys Tyr Tyr Asn Lys Ile Met Ser Ile 155 160 165 170	1108
tat cac aaa tat gct gag gtgaccacaa gaatacacca aattactcaa Tyr His Lys Tyr Ala Glu 175	1156
ttgcaagtaa acctaagtct gaggtgtaaa tgactgatct tgagatttat ttgcag act Thr	1215
ttc cca tgg gga ggg aaa ttg act ggt gaa tcc ata aag ttt ttc tcg Phe Pro Trp Gly Gly Lys Leu Thr Gly Glu Ser Ile Lys Phe Phe Ser 180 185 190	1263
cct ttg gtg atg tgg act agg ttt tcg tct agc aaa gaa aaa cat aag Pro Leu Val Met Trp Thr Arg Phe Ser Ser Ser Lys Glu Lys His Lys 195 200 205	1311
gct ttg ttc tct gcg ttt cta gag tac tat cag gtatatactc agcggccaaa Ala Leu Phe Ser Ala Phe Leu Glu Tyr Tyr Gln 210 215 220	1364
agctaagggtt ttattggaaa ctttgactga gaatctatca tcttcttcct acag gca Ala	1421

tgg ctt gag atg aca atc caa gtg agg gag gag atg gaa cca tct cat	1469
Trp Leu Glu Met Thr Ile Gln Val Arg Glu Glu Met Glu Pro Ser His	
225 230 235	
gtg aga gcc aat tgt gaa gca caa cac aag tac ctg aca tgg cga gca	1517
Val Arg Ala Asn Cys Glu Ala Gln His Lys Tyr Leu Thr Trp Arg Ala	
240 245 250	
caa aag gtgatttcatt ttccttttgt gtaatttgca tgtttgaaca gacactgtat	1573
Gln Lys	
255	
ctgtattggt acaatggata ttgatttggt gtttgcag gat cct gga cat ggt ctt	1629
Asp Pro Gly His Gly Leu	
260	
ctt aaa aga tta gta ggt gaa gca aag gca aag gtataaaaaga tttgatccca	1682
Leu Lys Arg Leu Val Gly Glu Ala Lys Ala Lys	
265 270	
ttagtggtccc cattattaat tagcttgtga agatgttgaa aatgatttga acaaaatcag	1742
gag ctg cta agg gat ttc ctg ttc aat ggg gtg gat gag tta ggc aca	1790
Glu Leu Leu Arg Asp Phe Leu Phe Asn Gly Val Asp Glu Leu Gly Thr	
275 280 285	
aaa aca ttc att gat tac ttt cca gag tac caa aca gaa gat gga act	1838
Lys Thr Phe Ile Asp Tyr Phe Pro Glu Tyr Gln Thr Glu Asp Gly Thr	
290 295 300	
gta agc gat aaa cga agt atc att ggg aag tca tat gaa act cgt cca	1886
Val Ser Asp Lys Arg Ser Ile Ile Gly Lys Ser Tyr Glu Thr Arg Pro	
305 310 315 320	
tgg gat tta aca gga caa ttt atc ggc taacaatgat atatgtgaac	1933
Trp Asp Leu Thr Gly Gln Phe Ile Gly	
325	
aagtcagatt tcagagtcatt caacacaaga ggacgtgaac ttagggaagt aggaataaga	1993
aagagcagca tgaggagtct ctcagggtcta tctgcatttc aagatgattg tttgagttac	2053
catgcattgt agttttacaa gtgtagctct cagcccttca tcaaaatgag aatcctcgag	2113
tatgatatga ttttaatgaa aatgtattcg tctctaccta atcaaca	2160

<210> 33
 <211> 329
 <212> PRT
 <213> Arabidopsis thaliana

<400> 33

Met Ala Leu Ser Met Glu Phe Gly Phe Ser Ile Gly Ser Cys Phe Lys
1 5 10 15

Ala Pro Asn Pro Pro Val Leu Ile Ser Ala Ser Pro Asn Lys Ile Asn
20 25 30

Phe Thr Leu Arg Arg Arg Lys Lys Arg Phe Leu Leu Arg Val Ser Ala
35 40 45

Val Ser Tyr Lys Glu Phe Ala Glu Ser Ala Leu Glu Glu Thr Arg Lys
50 55 60

Arg Ile Val Leu Glu Pro Ser His Leu Gln Glu Lys Tyr Ser Ser Met
65 70 75 80

Thr Gly Leu Asp Gly Lys Thr Glu Leu Gln Met Leu Ala Phe Lys Ser
85 90 95

Ser Lys Ile Arg Leu Leu Arg Ser Met Ala Ile Glu Asn Glu Thr Met
100 105 110

Gln Val Phe Asp Phe Ala Gly Phe Met Glu Pro Glu Tyr Asp Thr Pro
115 120 125

Ile Phe Cys Ala Asn Phe Phe Thr Ser Thr Asn Val Asn Ile Val Val
130 135 140

Leu Asp Leu Asn Pro Leu His Gln Leu Thr Asp Gln Thr Asp Tyr Gln
145 150 155 160

Asp Lys Tyr Tyr Asn Lys Ile Met Ser Ile Tyr His Lys Tyr Ala Glu
165 170 175

Thr Phe Pro Trp Gly Gly Lys Leu Thr Gly Glu Ser Ile Lys Phe Phe
180 185 190

Ser Pro Leu Val Met Trp Thr Arg Phe Ser Ser Ser Lys Glu Lys His
195 200 205

Lys Ala Leu Phe Ser Ala Phe Leu Glu Tyr Tyr Gln Ala Trp Leu Glu
210 215 220

Met Thr Ile Gln Val Arg Glu Glu Met Glu Pro Ser His Val Arg Ala
225 230 235 240

Asn Cys Glu Ala Gln His Lys Tyr Leu Thr Trp Arg Ala Gln Lys Asp
245 250 255

Pro Gly His Gly Leu Leu Lys Arg Leu Val Gly Glu Ala Lys Ala Lys
260 265 270

Glu Leu Leu Arg Asp Phe Leu Phe Asn Gly Val Asp Glu Leu Gly Thr
 275 280 285

Lys Thr Phe Ile Asp Tyr Phe Pro Glu Tyr Gln Thr Glu Asp Gly Thr
 290 295 300

Val Ser Asp Lys Arg Ser Ile Ile Gly Lys Ser Tyr Glu Thr Arg Pro
 305 310 315 320

Trp Asp Leu Thr Gly Gln Phe Ile Gly
 325

<210> 34
 <211> 329
 <212> PRT
 <213> Arapidopsis thaliana

<400> 34

Met Ala Leu Ser Met Glu Phe Gly Phe Ser Ile Gly Ser Cys Phe Lys
 1 5 10 15

Ala Pro Asn Pro Pro Val Leu Ile Ser Ala Ser Pro Asn Lys Ile Asn
 20 25 30

Phe Thr Leu Arg Arg Arg Lys Lys Arg Phe Leu Leu Arg Val Ser Ala
 35 40 45

Val Ser Tyr Lys Glu Phe Ala Glu Ser Ala Leu Glu Glu Thr Arg Lys
 50 55 60

Arg Ile Val Leu Glu Pro Ser His Leu Gln Glu Lys Tyr Ser Ser Met
 65 70 75 80

Thr Gly Leu Asp Gly Lys Thr Glu Leu Gln Met Leu Ala Phe Lys Ser
 85 90 95

Ser Lys Ile Arg Leu Leu Arg Ser Met Ala Ile Glu Asn Glu Thr Met
 100 105 110

Gln Val Phe Asp Phe Ala Gly Phe Met Glu Pro Glu Tyr Asp Thr Pro
 115 120 125

Ile Phe Cys Ala Asn Phe Phe Thr Ser Thr Asn Val Asn Ile Val Val
 130 135 140

Leu Asp Leu Asn Pro Leu His Gln Leu Thr Asp Gln Thr Asp Tyr Gln
 145 150 155 160

Asp Lys Tyr Tyr Asn Lys Ile Met Ser Ile Tyr His Lys Tyr Ala Glu
 165 170 175

Thr Phe Pro Trp Gly Gly Lys Leu Thr Gly Glu Ser Ile Lys Phe Phe
 180 185 190

Ser Pro Leu Val Met Trp Thr Arg Phe Ser Ser Ser Lys Glu Lys His
 195 200 205
 Lys Ala Leu Phe Ser Ala Phe Leu Glu Tyr Tyr Gln Ala Trp Leu Glu
 210 215 220
 Met Thr Ile Gln Val Arg Glu Glu Met Glu Pro Ser His Val Arg Ala
 225 230 235 240
 Asn Cys Glu Ala Gln His Lys Tyr Leu Thr Trp Arg Ala Gln Lys Asp
 245 250 255
 Pro Gly His Gly Leu Leu Lys Arg Leu Val Gly Glu Ala Lys Ala Lys
 260 265 270
 Glu Leu Leu Arg Asp Phe Leu Phe Asn Gly Val Asp Glu Leu Gly Thr
 275 280 285
 Lys Thr Phe Ile Asp Tyr Phe Pro Glu Tyr Gln Thr Glu Asp Gly Thr
 290 295 300
 Val Ser Asp Lys Arg Ser Ile Ile Gly Lys Ser Tyr Glu Thr Arg Pro
 305 310 315 320
 Trp Asp Leu Thr Gly Gln Phe Ile Gly
 325

<210> 35
 <211> 236
 <212> PRT
 <213> Synechococcus sp.

<400> 35

Met Phe Asp Ser Phe Leu Asn Glu Leu His Ser Asp Ile Thr Lys Arg
 1 5 10 15
 Gly Gly Ser Pro Leu Pro Leu Pro Glu Gly Leu Glu Glu Cys Arg Ser
 20 25 30
 Ser Lys Ser Ser Ser Val Ile Gln Ser Trp Leu Trp Asp Val Pro Gly
 35 40 45
 Phe Arg Arg Trp Arg Val Thr Arg Leu Asp Ala Gly Asp Ser Leu Gln
 50 55 60
 Val Phe Asn Ser Val Ala Tyr Pro Asp Tyr Asn Tyr Asp His Pro Leu
 65 70 75 80
 Met Gly Val Asp Leu Leu Trp Phe Gly Ala Arg Gln Lys Leu Val Ala
 85 90 95
 Val Leu Asp Phe Gln Pro Leu Val Gln Asp Lys Asp Tyr Leu Asp Arg
 100 105 110
 Tyr Phe Ser Gly Leu Lys Glu Leu Asn Gln Arg Phe Pro Asp Leu Asn
 115 120 125
 Gly Glu Glu Thr Met Arg Ser Phe Asp Pro Asn Gln Tyr Phe Ser Ser

130		135		140
Trp Leu Leu Phe Cys Arg Gly Gly Ala Glu Gln Ala Asp Leu Ser Leu				
145		150		155
Pro Lys Ala Phe Ser Ala Phe Leu Lys Ala Tyr Trp Asp Leu His Asp				
	165		170	175
Asn Ala Lys Ser Ile Pro Ser Thr Ile Pro Pro Glu Glu Val Lys Asn				
	180		185	190
Leu Gln Asp Lys Tyr Asp Ile Tyr Ser Ala Glu Arg Asp Pro Ala His				
	195		200	205
Gly Leu Phe Thr Ser His Phe Gly Lys Asp Trp Ser Asn Arg Phe Leu				
	210		215	220
His Glu Phe Leu Phe Pro Ala Ser Ser Ser His Lys				
225		230		235
<210> 36				
<211> 241				
<212> PRT				
<213> Prochlorococcus marinus				
<400> 36				
Met Asn Lys Leu Met Leu Gln Asp Leu His Asn Asn Leu Lys Arg Arg				
1	5		10	15
Ile Ile Ser His Gly Gly Lys Pro Ile Glu Val Glu Asn Gly Met Ser				
	20		25	30
Glu Arg Phe Ser His Lys Gln Asp Thr Val Ile Lys Ser Trp Leu Trp				
	35		40	45
Asp Val Pro Gly Phe Arg Arg Trp Arg Val Thr Arg Met Asp Ala Gly				
	50		55	60
Asp Lys Leu Gln Val Leu Asn Ser Val Ala Tyr Pro Ala Tyr Thr Asn				
65		70		75
Asp Lys Pro Ile Leu Gly Ile Asp Ile Leu Trp Phe Gly Leu Lys Arg				
	85		90	95
Lys Leu Val Ala Val Leu Asp Phe Gln Pro Leu Val Gln Glu Glu Arg				
	100		105	110
Tyr Phe Cys Arg Tyr Tyr Lys Asp Leu Gln Ile Leu Lys Asn Arg Phe				
	115		120	125
Val Asp Phe Asn Ser Gln Lys Thr Met Lys Ile Tyr Asp Ser Asn Lys				
	130		135	140
Tyr Phe Ser Pro Trp Val Leu Leu Tyr Asn Gly Ser Phe Asp Asp Leu				
145		150		155
Gln Cys Ser Leu Ala Lys Ile Leu Asp Glu Phe Leu His Ala Tyr Trp				
	165		170	175

Gln Val Asp Asn Asn Asn Ser Arg Glu Tyr Ile Lys Ile Ile Pro Ser
180 185 190

Lys Val Glu Gln Leu His Ile Asn Tyr Asp Ile Tyr Ser Ala Glu Arg
195 200 205

Asp Pro Ala His Gly Leu Phe Lys Ser Tyr Phe Gly Gln Thr Trp Ala
210 215 220

Asp Gln Phe Val Arg Glu Phe Leu Phe Pro His Ser His Leu Thr Ala
225 230 235 240

Asp

<210> 37
<211> 257
<212> PRT
<213> PROCHLOROCOCCUS MARINUS

<400> 37

Met Ile Ile Lys Arg Asp Asn Ser Leu Ser Lys Ile Asp Leu Arg Asp
1 5 10 15

Trp Ile Trp Thr Pro Phe Phe Asn Asp Leu Val Asp Lys Leu Ser Val
20 25 30

Phe Glu Ile Glu Pro Tyr Pro Val Ser His Asp Phe Leu Ser Lys Glu
35 40 45

Ser Ile Thr Gly Ser Arg Arg Asn Pro Val His Val Thr Thr Leu Thr
50 55 60

Trp Ala Ala Lys Phe Glu Lys Ile Lys Gln Val Arg Leu Ala Cys Ile
65 70 75 80

Lys Gly Gly Glu Ser Leu Ser Val Phe Asn Leu Leu Ile His Pro Leu
85 90 95

Asn Asp Tyr Asp Leu Pro Phe Phe Gly Ala Asp Phe Val Thr Leu Pro
100 105 110

Asn Gly His Leu Leu Ala Leu Asp Leu Gln Pro Ala Leu Lys Leu Asp
115 120 125

Asn Ile His Thr Glu Asn Val Trp Pro Arg Leu Ile Pro Leu His Asp
130 135 140

His Trp Gln Ser Leu Leu Pro Ser Gly Gly Glu Ile Pro Lys Glu Ala
145 150 155 160

Glu Pro Tyr Phe Ser Pro Gly Phe Leu Trp Ser Arg Leu Pro Leu Ser
165 170 175

Lys Glu Ser Asp Asn Ile Ile Ser Glu Ile Leu Arg Pro Ala Phe Gly
180 185 190

Glu Tyr Leu Ser Leu Tyr Ile Glu Leu Leu His Ile Ala Lys Pro Leu
195 200 205

Lys Lys Glu Arg Ala Leu Lys Ile Leu Glu Gly Gln Lys Ala Tyr Ile
 210 215 220
 Asn Tyr Arg Ser Thr Lys Asp Pro Ala Arg Ala Met Leu Cys Arg Phe
 225 230 235 240
 Tyr Gly Lys Glu Trp Thr Glu Asp Tyr Ile His Lys Val Leu Phe Asn
 245 250 255

Ile

<210> 38
 <211> 257
 <212> PRT
 <213> Synechococcus sp.

<400> 38

Met Thr Asn Gln Arg Phe Lys Ser Thr Asp Pro Val Asn Ile Glu Gly
 1 5 10 15
 Trp Ser Trp Gln Pro Phe Leu Glu Asp Ala Ile Lys Arg Leu Glu Gly
 20 25 30
 Leu Asn Val Glu Pro Tyr Pro Val Pro Asp Arg Phe Leu Gln Arg Glu
 35 40 45
 Asp Gln Thr Gly Ser Lys Ser Lys Ser Ile Pro Val Thr Thr Ala Thr
 50 55 60
 Trp Ala Cys Lys Thr Glu Lys Phe Arg Gln Val Arg Ala Ala Cys Val
 65 70 75 80
 Ser Ala Gly Ser Ala Ala Ser Val Leu Asn Phe Val Ile Asn Pro Lys
 85 90 95
 Ser Thr Tyr Gly Leu Pro Phe Phe Gly Gly Asp Leu Val Thr Phe Pro
 100 105 110
 Ala Gly His Leu Leu Ala Leu Asp Leu Gln Pro Ala Ile Lys Thr Asp
 115 120 125
 Glu Val His Thr Thr His Val Trp Asp Arg Leu Ile Pro Ile Phe Glu
 130 135 140
 Arg Trp Arg Asp Gln Leu Pro Tyr Gly Gly Pro Ile Pro Glu Glu Ala
 145 150 155 160
 Gln Pro Phe Phe Ser Pro Gly Phe Leu Trp Thr Arg Leu Pro Leu Gly
 165 170 175
 Glu Glu Gly Asp Glu Leu Ile Gln Ser Ile Val Arg Pro Ala Phe Asn
 180 185 190
 Asp Tyr Leu Asp Leu Tyr Leu Glu Leu Ala Ala Ser Ala Glu Arg Val
 195 200 205
 Thr Asp Glu Arg Ser Glu Val Leu Leu Gln Gly Gln Arg Lys Tyr Thr

210	215	220
Asp Tyr Arg Ala Glu Lys Asp Pro Ala Arg Gly Met Leu Thr Arg Phe		
225	230	235 240
His Gly Ser Glu Trp Thr Glu Ala Tyr Ile His Thr Val Leu Phe Asp		
	245	250 255
Leu		
<210> 39		
<211> 248		
<212> PRT		
<213> Synechocystis sp.		
<400> 39		
Met Ala Val Thr Asp Leu Ser Leu Thr Asn Ser Ser Leu Met Pro Thr		
1	5	10 15
Leu Asn Pro Met Ile Gln Gln Leu Ala Leu Ala Ile Ala Ala Ser Trp		
	20	25 30
Gln Ser Leu Pro Leu Lys Pro Tyr Gln Leu Pro Glu Asp Leu Gly Tyr		
	35	40 45
Val Glu Gly Arg Leu Glu Gly Glu Lys Leu Val Ile Glu Asn Arg Cys		
	50	55 60
Tyr Gln Thr Pro Gln Phe Arg Lys Met His Leu Glu Leu Ala Lys Val		
65	70	75 80
Gly Lys Gly Leu Asp Ile Leu His Cys Val Met Phe Pro Glu Pro Leu		
	85	90 95
Tyr Gly Leu Pro Leu Phe Gly Cys Asp Ile Val Ala Gly Pro Gly Gly		
	100	105 110
Val Ser Ala Ala Ile Ala Asp Leu Ser Pro Thr Gln Ser Asp Arg Gln		
	115	120 125
Leu Pro Ala Ala Tyr Gln Lys Ser Leu Ala Glu Leu Gly Gln Pro Glu		
	130	135 140
Phe Glu Gln Gln Arg Glu Leu Pro Pro Trp Gly Glu Ile Phe Ser Glu		
145	150	155 160
Tyr Cys Leu Phe Ile Arg Pro Ser Asn Val Thr Glu Glu Glu Arg Phe		
	165	170 175
Val Gln Arg Val Val Asp Phe Leu Gln Ile His Cys His Gln Ser Ile		
	180	185 190
Val Ala Glu Pro Leu Ser Glu Ala Gln Thr Leu Glu His Arg Gln Gly		
	195	200 205
Gln Ile His Tyr Cys Gln Gln Gln Gln Lys Asn Asp Lys Thr Arg Arg		
	210	215 220

Val Leu Glu Lys Ala Phe Gly Glu Ala Trp Ala Glu Arg Tyr Met Ser
 225 230 235 240

Gln Val Leu Phe Asp Val Ile Gln
 245

<210> 40
 <211> 490
 <212> PRT
 <213> Anabaena sp.

<400> 40

Met Ser Leu Thr Ser Ile Pro Ser Leu Arg Glu Gln Gln His Pro Leu
 1 5 10 15

Ile Arg Gln Leu Ala Asp Cys Ile Glu Glu Val Trp His Gln His Leu
 20 25 30

Asp Leu Ser Pro Tyr His Leu Pro Ala Glu Leu Gly Tyr Val Glu Gly
 35 40 45

Arg Leu Glu Gly Glu Lys Leu Thr Ile Glu Asn Arg Cys Tyr Gln Thr
 50 55 60

Pro Gln Phe Arg Lys Met His Leu Glu Leu Ala Lys Val Gly Asn Met
 65 70 75 80

Leu Asp Ile Leu His Cys Val Met Phe Pro Arg Pro Glu Tyr Asp Leu
 85 90 95

Pro Met Phe Gly Cys Asp Leu Val Gly Gly Arg Gly Gln Ile Ser Ala
 100 105 110

Ala Ile Ala Asp Leu Ser Pro Val His Leu Asp Arg Thr Leu Pro Glu
 115 120 125

Ser Tyr Asn Ser Ala Leu Thr Ser Leu Asn Thr Leu Asn Phe Ser Gln
 130 135 140

Pro Arg Glu Leu Pro Glu Trp Gly Asn Ile Phe Ser Asp Phe Cys Ile
 145 150 155 160

Phe Val Arg Pro Ser Ser Pro Glu Glu Glu Ala Met Phe Leu Gly Arg
 165 170 175

Val Arg Glu Phe Leu Gln Val His Cys Gln Gly Ala Ile Ala Ala Ser
 180 185 190

Pro Val Ser Ala Glu Gln Lys Gln Gln Ile Leu Ala Gly Gln His Asn
 195 200 205

Tyr Cys Ser Lys Gln Gln Gln Asn Asp Lys Thr Arg Arg Val Leu Glu
 210 215 220

Lys Ala Phe Gly Val Asp Trp Ala Glu Asn Tyr Met Thr Thr Val Leu
 225 230 235 240

Phe Asp Leu Pro Glu Met Ser Leu Thr Ser Ile Pro Ser Leu Arg Glu
 245 250 255

Gln Gln His Pro Leu Ile Arg Gln Leu Ala Asp Cys Ile Glu Glu Val
 260 265 270
 Trp His Gln His Leu Asp Leu Ser Pro Tyr His Leu Pro Ala Glu Leu
 275 280 285
 Gly Tyr Val Glu Gly Arg Leu Glu Gly Glu Lys Leu Thr Ile Glu Asn
 290 295 300
 Arg Cys Tyr Gln Thr Pro Gln Phe Arg Lys Met His Leu Glu Leu Ala
 305 310 315 320
 Lys Val Gly Asn Met Leu Asp Ile Leu His Cys Val Met Phe Pro Arg
 325 330 335
 Pro Glu Tyr Asp Leu Pro Met Phe Gly Cys Asp Leu Val Gly Gly Arg
 340 345 350
 Gly Gln Ile Ser Ala Ala Ile Ala Asp Leu Ser Pro Val His Leu Asp
 355 360 365
 Arg Thr Leu Pro Glu Ser Tyr Asn Ser Ala Leu Thr Ser Leu Asn Thr
 370 375 380
 Leu Asn Phe Ser Gln Pro Arg Glu Leu Pro Glu Trp Gly Asn Ile Phe
 385 390 395 400
 Ser Asp Phe Cys Ile Phe Val Arg Pro Ser Ser Pro Glu Glu Glu Ala
 405 410 415
 Met Phe Leu Gly Arg Val Arg Glu Phe Leu Gln Val His Cys Gln Gly
 420 425 430
 Ala Ile Ala Ala Ser Pro Val Ser Ala Glu Gln Lys Gln Gln Ile Leu
 435 440 445
 Ala Gly Gln His Asn Tyr Cys Ser Lys Gln Gln Gln Asn Asp Lys Thr
 450 455 460
 Arg Arg Val Leu Glu Lys Ala Phe Gly Val Asp Trp Ala Glu Asn Tyr
 465 470 475 480
 Met Thr Thr Val Leu Phe Asp Leu Pro Glu
 485 490

<210> 41
 <211> 245
 <212> PRT
 <213> Nostoc punctiforme

<400> 41

Met Ser Phe Thr Ser Met Pro Ser Leu Arg Glu Gln Gln His Pro Leu
 1 5 10 15
 Ile Arg Gln Leu Ala Asp Cys Ile Glu Ala Ala Trp His Gln His Leu
 20 25 30
 Asp Leu Ser Pro Tyr His Leu Pro Asp Glu Leu Gly Tyr Val Glu Gly

35					40					45					
Arg	Leu	Glu	Gly	Glu	Lys	Leu	Thr	Ile	Glu	Asn	Arg	Cys	Tyr	Gln	Thr
50					55					60					
Pro	Gln	Phe	Arg	Lys	Met	His	Leu	Glu	Leu	Ala	Asn	Ile	Gly	Asn	Met
65				70						75				80	
Leu	Asp	Ile	Leu	His	Cys	Val	Met	Phe	Pro	Arg	Pro	Gln	Tyr	Asn	Leu
				85					90					95	
Pro	Met	Phe	Gly	Cys	Asp	Leu	Val	Gly	Gly	Arg	Gly	Gln	Ile	Ser	Ala
			100					105					110		
Ala	Ile	Ala	Asp	Leu	Ser	Pro	Ile	Gln	Leu	Glu	Arg	Thr	Leu	Pro	Glu
		115					120					125			
Ser	Tyr	Thr	Thr	Ala	Leu	Ala	Gln	Leu	Pro	Val	Leu	Asn	Phe	Ser	Gln
	130					135					140				
Pro	Arg	Glu	Leu	Pro	Glu	Trp	Gly	Asn	Ile	Phe	Ser	Asp	Phe	Cys	Ile
145				150					155					160	
Phe	Val	Arg	Pro	Gly	Ser	Pro	Glu	Glu	Glu	Ala	Met	Phe	Leu	Ser	Arg
				165				170						175	
Val	Arg	Glu	Phe	Leu	Asp	Ile	His	Cys	Met	Gln	Ala	Ile	Ala	Ser	His
			180					185					190		
Pro	Val	Ser	Val	Glu	Gln	Val	Thr	Gln	Asn	Leu	Ala	Gly	Gln	His	Asn
		195					200					205			
Tyr	Cys	Thr	Lys	Gln	Gln	Gln	Asn	Asp	Lys	Thr	Arg	Arg	Val	Leu	Glu
	210					215					220				
Lys	Ala	Phe	Gly	Pro	Val	Trp	Ala	Glu	Asn	Tyr	Met	Thr	Thr	Val	Leu
225				230					235					240	
Phe	Asp	Leu	Pro	Thr											
				245											

<210> 42
 <211> 248
 <212> PRT
 <213> Synechocystis sp.

<400> 42

Met	Ala	Val	Thr	Asp	Leu	Ser	Leu	Thr	Asn	Ser	Ser	Leu	Met	Pro	Thr
1				5					10					15	
Leu	Asn	Pro	Met	Ile	Gln	Gln	Leu	Ala	Leu	Ala	Ile	Ala	Ala	Ser	Trp
			20					25						30	
Gln	Ser	Leu	Pro	Leu	Lys	Pro	Tyr	Gln	Leu	Pro	Glu	Asp	Leu	Gly	Tyr
		35					40					45			
Val	Glu	Gly	Arg	Leu	Glu	Gly	Glu	Lys	Leu	Val	Ile	Glu	Asn	Arg	Cys
	50					55					60				

Tyr Gln Thr Pro Gln Phe Arg Lys Met His Leu Glu Leu Ala Lys Val
 65 70 75 80
 Gly Lys Gly Leu Asp Ile Leu His Cys Val Met Phe Pro Glu Pro Leu
 85 90 95
 Tyr Gly Leu Pro Leu Phe Gly Cys Asp Ile Val Ala Gly Pro Gly Gly
 100 105 110
 Val Ser Ala Ala Ile Ala Asp Leu Ser Pro Thr Gln Ser Asp Arg Gln
 115 120 125
 Leu Pro Ala Ala Tyr Gln Lys Ser Leu Ala Glu Leu Gly Gln Pro Glu
 130 135 140
 Phe Glu Gln Gln Arg Glu Leu Pro Pro Trp Gly Glu Ile Phe Ser Glu
 145 150 155 160
 Tyr Cys Leu Phe Ile Arg Pro Ser Asn Val Thr Glu Glu Glu Arg Phe
 165 170 175
 Val Gln Arg Val Val Asp Phe Leu Gln Ile His Cys His Gln Ser Ile
 180 185 190
 Val Ala Glu Pro Leu Ser Glu Ala Gln Thr Leu Glu His Arg Gln Gly
 195 200 205
 Gln Ile His Tyr Cys Gln Gln Gln Gln Lys Asn Asp Lys Thr Arg Arg
 210 215 220
 Val Leu Glu Lys Ala Phe Gly Glu Ala Trp Ala Glu Arg Tyr Met Ser
 225 230 235 240
 Gln Val Leu Phe Asp Val Ile Gln
 245

<210> 43
 <211> 247
 <212> PRT
 <213> Synechocystis sp.

<400> 43

Met Gln Ser Pro Pro Ser Glu Ser Ser Ser Thr Val Ala Pro Leu Ile
 1 5 10 15
 Pro Ser Leu Ala Glu Thr Ile Arg Gly Ala Trp Ile Gly Leu Pro Glu
 20 25 30
 Leu Lys Pro Leu Asp Ala Asp Ser Asp Phe Ser Ser Ile Glu Gly Gln
 35 40 45
 Leu Glu Gly Asp Asp Leu Leu Ile Arg Asn Glu Leu Leu Cys Cys Arg
 50 55 60
 Val Gly Arg Lys Ile His Leu Glu Leu Ala Arg Leu Gly Arg Gly Leu
 65 70 75 80
 Gln Ile Leu His Cys Val Trp Phe Pro Asp Pro Arg Phe Asp Leu Pro
 85 90 95

Ile Phe Gly Ala Asp Ile Val Ala Gly Pro Ala Gly Val Ser Ala Ala
 100 105 110
 Ile Val Asp Leu Ser Pro Val Ser Gly Thr Leu Pro Ser Gly Ile Glu
 115 120 125
 Thr Ala Leu Ala Gly Thr Pro Ser Pro Ala Phe Arg Gln Val Arg Asp
 130 135 140
 Leu Pro Gly Trp Gly Thr Ile Phe Ser Pro His Val Cys Phe Ile Arg
 145 150 155 160
 Pro Asp Gly Ala Glu Glu Glu Val Leu Phe Arg Ser Arg Val Glu Glu
 165 170 175
 Val Leu Thr Ile Leu Arg Thr Ala Val Leu Gln Thr Ala Cys Glu Pro
 180 185 190
 Ala Thr Ala Ala Ser Thr Ile Arg Arg Tyr Glu Gly Gln Leu Ser Tyr
 195 200 205
 Cys Leu Gln Gln Lys Arg Asn Asp Lys Thr Arg Arg Val Leu Glu Lys
 210 215 220
 Ala Phe Asp Ala Ser Trp Ala Asp Arg Tyr Ile Glu Glu Leu Leu Phe
 225 230 235 240
 Asp Asp Pro Leu Pro Pro Gly
 245

<210> 44
 <211> 243
 <212> PRT
 <213> Prochlorococcus marinus

<400> 44

Leu Asn Leu Leu Ser Lys Ser Leu Thr Lys Thr Lys Leu Ile Asp Pro
 1 5 10 15
 Leu Ile Leu Thr Leu Leu Gln Asn Ile Lys Val Gln Arg Ser Lys Leu
 20 25 30
 Asn Asp Leu Asn Cys Ile Glu Val Asp Pro Lys Leu Ser Asn Ile Ile
 35 40 45
 Ser Asn Glu Glu Gly Lys Glu Leu Tyr Ile Glu Asn Glu Phe Tyr Lys
 50 55 60
 Ala Lys Gly Phe Arg Lys Leu His Ile Glu Val Ala Glu Phe Ser Lys
 65 70 75 80
 Ser Leu Lys Ile Leu His Cys Val Phe Phe Pro Asp Pro Lys Tyr Asp
 85 90 95
 Ile Pro Ile Phe Gly Met Asp Leu Val Lys Val Asn Glu Leu Val Ser
 100 105 110
 Ala Ala Ile Val Asp Leu Ser Pro Ser Ser Lys Asn Gln Asn Leu Lys

115					120					125						
Tyr	Asp	His	Leu	Leu	Ser	His	Ile	Asp	Lys	Ser	Val	Phe	Lys	Ser	Lys	
130					135					140						
Arg	Glu	Ile	Pro	Ile	Trp	Gly	Asn	Ile	Phe	Ser	Lys	Asn	Val	Phe	Phe	
145					150					155					160	
Ala	Ser	Leu	Lys	Asn	Glu	Ser	Glu	Lys	Asn	Ala	Phe	Cys	Lys	Ile	Val	
165					170					175						
Asp	Asn	Tyr	Leu	Ser	Val	Leu	Ile	Gln	Leu	Ser	Gln	Ser	Thr	Ser	Pro	
180					185					190						
Asp	Ser	Asp	Tyr	Glu	Ile	Ile	Glu	Glu	Arg	Ile	Asn	Tyr	Gln	Lys	Asn	
195					200					205						
Tyr	Cys	Val	Gln	Gln	Met	Lys	Asn	Glu	Lys	Thr	Ser	Leu	Val	Leu	Leu	
210					215					220						
Lys	Tyr	Phe	Asp	Lys	Val	Trp	Val	Asp	Glu	Tyr	Ile	Lys	Lys	Val	Leu	
225					230					235					240	
Phe Asp Phe																

<210> 45
 <211> 236
 <212> PRT
 <213> Synechocystis sp.

<400> 45

Met	Phe	Asp	Ser	Phe	Leu	Asn	Glu	Leu	His	Ser	Asp	Ile	Thr	Lys	Arg
1				5					10					15	
Gly	Gly	Ser	Pro	Leu	Pro	Leu	Pro	Glu	Gly	Leu	Glu	Glu	Cys	Arg	Ser
			20					25					30		
Ser	Lys	Ser	Ser	Ser	Val	Ile	Gln	Ser	Trp	Leu	Trp	Asp	Val	Pro	Gly
			35				40					45			
Phe	Arg	Arg	Trp	Arg	Val	Thr	Arg	Leu	Asp	Ala	Gly	Asp	Ser	Leu	Gln
	50					55					60				
Val	Phe	Asn	Ser	Val	Ala	Tyr	Pro	Asp	Tyr	Asn	Tyr	Asp	His	Pro	Leu
65					70				75					80	
Met	Gly	Val	Asp	Leu	Leu	Trp	Phe	Gly	Ala	Arg	Gln	Lys	Leu	Val	Ala
				85				90					95		
Val	Leu	Asp	Phe	Gln	Pro	Leu	Val	Gln	Asp	Lys	Asp	Tyr	Leu	Asp	Arg
			100					105					110		
Tyr	Phe	Ser	Gly	Leu	Lys	Glu	Leu	Asn	Gln	Arg	Phe	Pro	Asp	Leu	Asn
			115				120					125			
Gly	Glu	Glu	Thr	Met	Arg	Ser	Phe	Asp	Pro	Asn	Gln	Tyr	Phe	Ser	Ser
	130					135					140				

Trp Leu Leu Phe Cys Arg Gly Gly Ala Glu Gln Ala Asp Leu Ser Leu
145 150 155 160

Pro Lys Ala Phe Ser Ala Phe Leu Lys Ala Tyr Trp Asp Leu His Asp
165 170 175

Asn Ala Lys Ser Ile Pro Ser Thr Ile Pro Pro Glu Glu Val Lys Asn
180 185 190

Leu Gln Asp Lys Tyr Asp Ile Tyr Ser Ala Glu Arg Asp Pro Ala His
195 200 205

Gly Leu Phe Thr Ser His Phe Gly Lys Asp Trp Ser Asn Arg Phe Leu
210 215 220

His Glu Phe Leu Phe Pro Ala Ser Ser Ser His Lys
225 230 235

<210> 46

<211> 235

<212> PRT

<213> Synechocystis sp.

<400> 46

Met Phe Asp Pro Phe Leu Glu Glu Leu Gln Thr Gly Ile Gln Ala Arg
1 5 10 15

Gly Gly Ile Ser Val Glu Val Pro Ala Gly Leu Glu His Asn Gln Ser
20 25 30

Gln Lys Gly Ser Ser Thr Ile Gln Ser Trp Leu Trp Gln Val Pro Gly
35 40 45

Phe Arg Arg Trp Arg Val Thr Arg Leu Asp Ala Gly Asp Ser Leu Gln
50 55 60

Val Leu Asn Ser Val Ala Tyr Pro Asp Phe Asp Leu Asp His Pro Leu
65 70 75 80

Met Gly Val Asp Leu Leu Trp Phe Gly Ala Arg Gln Lys Leu Val Ala
85 90 95

Val Leu Asp Phe Gln Pro Leu Val Gln Asp Lys Asp Tyr Leu Asp Arg
100 105 110

His Phe Asp Gly Leu Lys Asp Leu Asn Ala Arg Phe Pro Asp Leu Asn
115 120 125

Gly Glu Glu Thr Met Arg Ser Phe Asp Pro Asn Gln Tyr Phe Ser Ser
130 135 140

Trp Leu Leu Phe Cys Arg Gly Gly Ser Glu Glu Ala Asp Arg Ser Leu
145 150 155 160

Pro Lys Ala Phe Ser Ala Phe Leu Lys Ala Tyr Trp Gly Leu His Asp
165 170 175

Glu Ala Ser Lys Glu Pro Ser Ser Ile Ser Pro Gly Asp Val Glu Arg
180 185 190

Leu Gln Asn Ala Tyr Asp Val Tyr Ser Ala Glu Arg Asp Pro Ala His
 195 200 205

Gly Leu Phe Thr Ser His Phe Gly Lys Glu Trp Ser Asp Arg Phe Leu
 210 215 220

His Glu Phe Leu Phe Pro Ala Ser Gln Pro Ala
 225 230 235

<210> 47

<211> 241

<212> PRT

<213> Prochlorococcus sp.

<400> 47

Met Asn Lys Leu Met Leu Gln Asp Leu His Asn Asn Leu Lys Arg Arg
 1 5 10 15

Ile Ile Ser His Gly Gly Lys Pro Ile Glu Val Glu Asn Gly Met Ser
 20 25 30

Glu Arg Phe Ser His Lys Gln Asp Thr Val Ile Lys Ser Trp Leu Trp
 35 40 45

Asp Val Pro Gly Phe Arg Arg Trp Arg Val Thr Arg Met Asp Ala Gly
 50 55 60

Asp Lys Leu Gln Val Leu Asn Ser Val Ala Tyr Pro Ala Tyr Thr Asn
 65 70 75 80

Asp Lys Pro Ile Leu Gly Ile Asp Ile Leu Trp Phe Gly Leu Lys Arg
 85 90 95

Lys Leu Val Ala Val Leu Asp Phe Gln Pro Leu Val Gln Glu Glu Arg
 100 105 110

Tyr Phe Cys Arg Tyr Tyr Lys Asp Leu Gln Ile Leu Lys Asn Arg Phe
 115 120 125

Val Asp Phe Asn Ser Gln Lys Thr Met Lys Ile Tyr Asp Ser Asn Lys
 130 135 140

Tyr Phe Ser Pro Trp Val Leu Leu Tyr Asn Gly Ser Phe Asp Asp Leu
 145 150 155 160

Gln Cys Ser Leu Ala Lys Ile Leu Asp Glu Phe Leu His Ala Tyr Trp
 165 170 175

Gln Val Asp Asn Asn Asn Ser Arg Glu Tyr Ile Lys Ile Ile Pro Ser
 180 185 190

Lys Val Glu Gln Leu His Ile Asn Tyr Asp Ile Tyr Ser Ala Glu Arg
 195 200 205

Asp Pro Ala His Gly Leu Phe Lys Ser Tyr Phe Gly Gln Thr Trp Ala
 210 215 220

Asp Gln Phe Val Arg Glu Phe Leu Phe Pro His Ser His Leu Thr Ala

<213> Nostoc punctiforme

<400> 49

Met	Leu	Asn	Ser	Gln	Ser	Pro	Leu	Arg	Asn	Val	Ala	Leu	Phe	Leu	Ile	
1				5					10					15		
Asn	Glu	Thr	Cys	Met	Ile	Ala	Ile	Thr	Tyr	Phe	His	Ala	Arg	Val	Asn	
			20					25					30			
Lys	Ser	Cys	Ser	Met	Tyr	Lys	Pro	Phe	Leu	Glu	Phe	Leu	Glu	Lys	Glu	
		35					40					45				
Leu	Phe	Gln	Arg	Phe	Asp	Leu	Gln	Ser	Arg	Val	Ile	Pro	Pro	Gly	Leu	
	50					55					60					
Glu	Phe	Lys	Val	Ser	Asp	Arg	Gly	Arg	Asn	Pro	Ala	Thr	Ile	Arg	Ser	
65					70				75						80	
Trp	Cys	Tyr	Gln	Ser	Gln	Glu	Leu	Arg	Lys	Ile	Arg	Tyr	Thr	Tyr	Ile	
				85					90					95		
Asp	Ala	Gly	Glu	Ser	Ala	Gln	Ile	Phe	Asn	Ser	Val	Val	Tyr	Pro	Ser	
			100					105					110			
His	Asn	Tyr	Asp	Leu	Pro	Leu	Leu	Gly	Ile	Asp	Phe	Leu	Ser	Phe	Gly	
		115					120					125				
Lys	Val	Lys	Asn	Leu	Ile	Val	Leu	Asp	Phe	Gln	Pro	Leu	Phe	Gln	Asp	
	130					135					140					
Glu	Asp	Tyr	Gln	Asn	Lys	Tyr	Ile	Ala	Pro	Leu	Lys	Tyr	Leu	His	Asn	
145					150					155					160	
Lys	Tyr	Pro	Asp	Leu	Ala	Gln	Asn	Leu	Glu	Met	Lys	Phe	Tyr	Asp	Ala	
				165					170					175		
Asn	Gln	Tyr	Phe	Ser	Lys	Tyr	Leu	Leu	Phe	Ala	Lys	Thr	Asp	Ala	Glu	
			180					185					190			
Thr	Val	Ser	Thr	Arg	Val	Phe	Glu	Ala	Phe	Gln	Asp	Tyr	Leu	Asn	Leu	
		195					200					205				
Tyr	Trp	Gln	Met	Leu	Ala	Asp	Ala	Gln	Ala	Leu	His	Asp	Pro	Glu	Asp	
	210					215					220					
Ile	Gln	Arg	Ile	Val	Lys	Ala	Gln	Lys	Asp	Tyr	Asp	Gln	Tyr	Ser	Ala	
225					230					235					240	
Asp	Arg	Asp	Pro	Ala	Ser	Gly	Leu	Phe	Ser	Ser	Tyr	Phe	Gly	His	Glu	
				245					250					255		
Trp	Ala	Glu	Arg	Phe	Leu	His	Glu	Phe	Leu	Phe	Glu	Asp	Ala	Val	Pro	
			260					265					270			
Leu	Ala	Val	Ser	Ala	Ser	Lys	Arg									
		275					280									

<210> 50

<211> 257

<212> PRT
<213> Synechocystis sp.

<400> 50

Met Thr Asn Gln Arg Phe Lys Ser Thr Asp Pro Val Asn Ile Glu Gly
1 5 10 15
Trp Ser Trp Gln Pro Phe Leu Glu Asp Ala Ile Lys Arg Leu Glu Gly
20 25 30
Leu Asn Val Glu Pro Tyr Pro Val Pro Asp Arg Phe Leu Gln Arg Glu
35 40 45
Asp Gln Thr Gly Ser Lys Ser Lys Ser Ile Pro Val Thr Thr Ala Thr
50 55 60
Trp Ala Cys Lys Thr Glu Lys Phe Arg Gln Val Arg Ala Ala Cys Val
65 70 75 80
Ser Ala Gly Ser Ala Ala Ser Val Leu Asn Phe Val Ile Asn Pro Lys
85 90 95
Ser Thr Tyr Gly Leu Pro Phe Phe Gly Gly Asp Leu Val Thr Phe Pro
100 105 110
Ala Gly His Leu Leu Ala Leu Asp Leu Gln Pro Ala Ile Lys Thr Asp
115 120 125
Glu Val His Thr Thr His Val Trp Asp Arg Leu Ile Pro Ile Phe Glu
130 135 140
Arg Trp Arg Asp Gln Leu Pro Tyr Gly Gly Pro Ile Pro Glu Glu Ala
145 150 155 160
Gln Pro Phe Phe Ser Pro Gly Phe Leu Trp Thr Arg Leu Pro Leu Gly
165 170 175
Glu Glu Gly Asp Glu Leu Ile Gln Ser Ile Val Arg Pro Ala Phe Asn
180 185 190
Asp Tyr Leu Asp Leu Tyr Leu Glu Leu Ala Ala Ser Ala Glu Arg Val
195 200 205
Thr Asp Glu Arg Ser Glu Val Leu Leu Gln Gly Gln Arg Lys Tyr Thr
210 215 220
Asp Tyr Arg Ala Glu Lys Asp Pro Ala Arg Gly Met Leu Thr Arg Phe
225 230 235 240
His Gly Ser Glu Trp Thr Glu Ala Tyr Ile His Thr Val Leu Phe Asp
245 250 255

Leu

<210> 51
<211> 262
<212> PRT
<213> Synechocystis sp.

<400> 51

Met Ser Ile Asp Leu Arg Ala Ser Ser Leu Asp Pro Val Gln Ile Pro
1 5 10 15
Gly Trp Arg Trp Gln Pro Phe Leu Asp Glu Ala Ser Ala Ala Leu Lys
20 25 30
Pro Phe Asn Pro Ser Pro Tyr Pro Ile Ala Glu Thr Phe Leu Gln Lys
35 40 45
Glu Gly Ser Thr Gly Ser Lys Ala Lys Pro Val Pro Val Thr Thr Ala
50 55 60
Thr Trp Ala Cys Ser Thr Asp Lys Leu Arg Gln Val Arg Cys Ala Cys
65 70 75 80
Val Glu Ala Gly Met Ala Ala Ser Val Leu Asn Phe Val Ile Asn Pro
85 90 95
Ser Cys Arg Phe Asp Leu Pro Phe Phe Gly Ala Asp Leu Val Thr Leu
100 105 110
Pro Asn Gly His Leu Leu Ala Leu Asp Leu Gln Pro Val Asp Lys Ala
115 120 125
Asp Pro Asp His Thr Gln Pro Val Trp Glu Arg Leu Met Pro Leu Phe
130 135 140
Glu Arg Trp Gln Ala Glu Leu Pro Asp Gly Gly Pro Ile Pro Glu Glu
145 150 155 160
Ala Gln Pro Tyr Phe Ser Pro Ala Phe Leu Trp Thr Arg Ile Pro Leu
165 170 175
Gly Glu Glu Gly Asp Glu Leu Ile Glu Arg Val Ile Arg Pro Ala Phe
180 185 190
Ile Asp Tyr Leu Gln Leu Tyr Leu Asn Leu Val Ala Glu Ala Glu Pro
195 200 205
Val Ser Asp Asp Arg Ala Glu Leu Leu Leu Ser Gly Gln Lys Arg Tyr
210 215 220
Thr Ala Tyr Arg Ala Glu Lys Asp Pro Ala Arg Gly Met Leu Thr Arg
225 230 235 240
Phe Tyr Gly Ser Glu Trp Thr Glu Ser Tyr Ile His Gly Val Leu Phe
245 250 255
Asp Leu Glu Asp Ala Ala
260

<210> 52

<211> 257

<212> PRT

<213> Prochlorococcus marinus

<400> 52

Met Ile Ile Lys Arg Asp Asn Ser Leu Ser Lys Ile Asp Leu Arg Asp
 1 5 10 15
 Trp Ile Trp Thr Pro Phe Phe Asn Asp Leu Val Asp Lys Leu Ser Val
 20 25 30
 Phe Glu Ile Glu Pro Tyr Pro Val Ser His Asp Phe Leu Ser Lys Glu
 35 40 45
 Ser Ile Thr Gly Ser Arg Arg Asn Pro Val His Val Thr Thr Leu Thr
 50 55 60
 Trp Ala Ala Lys Phe Glu Lys Ile Lys Gln Val Arg Leu Ala Cys Ile
 65 70 75 80
 Lys Gly Gly Glu Ser Leu Ser Val Phe Asn Leu Leu Ile His Pro Leu
 85 90 95
 Asn Asp Tyr Asp Leu Pro Phe Phe Gly Ala Asp Phe Val Thr Leu Pro
 100 105 110
 Asn Gly His Leu Leu Ala Leu Asp Leu Gln Pro Ala Leu Lys Leu Asp
 115 120 125
 Asn Ile His Thr Glu Asn Val Trp Pro Arg Leu Ile Pro Leu His Asp
 130 135 140
 His Trp Gln Ser Leu Leu Pro Ser Gly Gly Glu Ile Pro Lys Glu Ala
 145 150 155 160
 Glu Pro Tyr Phe Ser Pro Gly Phe Leu Trp Ser Arg Leu Pro Leu Ser
 165 170 175
 Lys Glu Ser Asp Asn Ile Ile Ser Glu Ile Leu Arg Pro Ala Phe Gly
 180 185 190
 Glu Tyr Leu Ser Leu Tyr Ile Glu Leu Leu His Ile Ala Lys Pro Leu
 195 200 205
 Lys Lys Glu Arg Ala Leu Lys Ile Leu Glu Gly Gln Lys Ala Tyr Ile
 210 215 220
 Asn Tyr Arg Ser Thr Lys Asp Pro Ala Arg Ala Met Leu Cys Arg Phe
 225 230 235 240
 Tyr Gly Lys Glu Trp Thr Glu Asp Tyr Ile His Lys Val Leu Phe Asn
 245 250 255

Ile

<210> 53
 <211> 257
 <212> PRT
 <213> Prochlorococcus sp.

<400> 53

Met Leu Ile Gln Asn Thr Ile Phe Tyr Ser Gln Glu Trp Arg Trp Ala

1	5	10	15
Lys Phe Ile	Lys Phe Leu Ile	Ser Gln Leu Asp Asn Tyr	His Cys Val
20		25	30
Glu His Lys	Ile Ala Ser Asp Phe	Ser Tyr Lys Glu	Ser Ser Tyr Gly
35		40	45
Ser Lys Lys	Ser Lys Lys Asn Ile	Asn Leu Phe Thr	Trp Gly Ala Thr
50		55	60
His Gln Lys	Arg Ile Asn Phe Ala Arg	Ala Val Cys Ile	Asn Ser Pro
65		70	75
Asn Tyr Ser	Val Leu Asn Phe Leu Ile	Ile Pro Lys Thr	Ser Tyr Asn
	85	90	95
Ile Pro Phe	Leu Gly Val Asp Phe	Val Ser Leu Pro	Thr Ser His Leu
	100	105	110
Leu Val Leu	Asp Phe Gln Pro Ser	Leu Lys Val Glu	Asn Gln Phe Asn
	115	120	125
Ser Glu Leu	Leu Glu Gln Ile Ile	Lys Leu Lys Lys	Ser Cys His Ser
130		135	140
Ser Leu Pro	Val Ala Glu Lys Met	Ser Glu Gln Val	Ala Lys Phe Phe
145		150	155
Ser Pro Gly	Leu Ile Trp Ser Arg	Leu Ala Lys His	Gln Asp Ser Asp
	165	170	175
Asn Leu Ile	Glu Asn Gln Leu Tyr	Asp Ser Phe Lys	Glu Tyr Leu Asn
	180	185	190
Leu Tyr Leu	Lys Thr Leu Phe Glu	Ser Glu Glu Val	Gly His Gly Leu
	195	200	205
Gln Gln Glu	Leu Ile Asn Gly Gln	Asn Asp Tyr Leu	Asn Tyr Arg Arg
	210	215	220
Asp Asn Asp	Pro Ala Arg Pro Met	Leu Ser Ser Leu	Phe Gly Lys Asp
225		230	235
Phe Thr Glu	Ser Leu Ile Asn Lys	Val Leu Phe Ser	Thr Asn Lys Val
	245	250	255

Leu

<210> 54
 <211> 255
 <212> PRT
 <213> Nostoc punctiforme

<400> 54

Met Asn Ser	Glu Arg Ser Asp	Val Thr Leu Tyr	Gln Pro Phe	Leu Asp
1	5	10	15	

Tyr Ala Ile Ala Tyr Met Arg Ser Arg Leu Asp Leu Glu Pro Tyr Pro
 20 25 30
 Ile Pro Thr Gly Phe Glu Ser Asn Ser Ala Val Val Gly Lys Gly Lys
 35 40 45
 Asn Gln Glu Glu Val Val Thr Thr Ser Tyr Ala Phe Gln Thr Ala Lys
 50 55 60
 Leu Arg Gln Ile Arg Ala Ala His Val Gln Gly Gly Asn Ser Leu Gln
 65 70 75 80
 Val Leu Asn Phe Val Ile Phe Pro His Leu Asn Tyr Asp Leu Pro Phe
 85 90 95
 Phe Gly Ala Asp Leu Val Thr Leu Pro Gly Gly His Leu Ile Ala Leu
 100 105 110
 Asp Met Gln Pro Leu Phe Arg Asp Asp Ser Ala Tyr Gln Ala Lys Tyr
 115 120 125
 Thr Glu Pro Ile Leu Pro Ile Phe His Ala His Gln Gln His Leu Ser
 130 135 140
 Trp Gly Gly Asp Phe Pro Glu Glu Ala Gln Pro Phe Phe Ser Pro Ala
 145 150 155 160
 Phe Leu Trp Thr Arg Pro Gln Glu Thr Ala Val Val Glu Thr Gln Val
 165 170 175
 Phe Ala Ala Phe Lys Asp Tyr Leu Lys Ala Tyr Leu Asp Phe Val Glu
 180 185 190
 Gln Ala Glu Ala Val Thr Asp Ser Gln Asn Leu Val Ala Ile Lys Gln
 195 200 205
 Ala Gln Leu Arg Tyr Leu Arg Tyr Arg Ala Glu Lys Asp Pro Ala Arg
 210 215 220
 Gly Met Phe Lys Arg Phe Tyr Gly Ala Glu Trp Thr Glu Glu Tyr Ile
 225 230 235 240
 His Gly Phe Leu Phe Asp Leu Glu Arg Lys Leu Thr Val Val Lys
 245 250 255

<210> 55
 <211> 329
 <212> PRT
 <213> Arapidopsis thaliana

<400> 55

Met Ala Leu Ser Met Glu Phe Gly Phe Ser Ile Gly Ser Cys Phe Lys
 1 5 10 15
 Ala Pro Asn Pro Pro Val Leu Ile Ser Ala Ser Pro Asn Lys Ile Asn
 20 25 30
 Phe Thr Leu Arg Arg Arg Lys Lys Arg Phe Leu Leu Arg Val Ser Ala
 35 40 45

Val Ser Tyr Lys Glu Phe Ala Glu Ser Ala Leu Glu Glu Thr Arg Lys
 50 55 60
 Arg Ile Val Leu Glu Pro Ser His Leu Gln Glu Lys Tyr Ser Ser Met
 65 70 75 80
 Thr Gly Leu Asp Gly Lys Thr Glu Leu Gln Met Leu Ala Phe Lys Ser
 85 90 95
 Ser Lys Ile Arg Leu Leu Arg Ser Met Ala Ile Glu Asn Glu Thr Met
 100 105 110
 Gln Val Phe Asp Phe Ala Gly Phe Met Glu Pro Glu Tyr Asp Thr Pro
 115 120 125
 Ile Phe Cys Ala Asn Phe Phe Thr Ser Thr Asn Val Asn Ile Val Val
 130 135 140
 Leu Asp Leu Asn Pro Leu His Gln Leu Thr Asp Gln Thr Asp Tyr Gln
 145 150 155 160
 Asp Lys Tyr Tyr Asn Lys Ile Met Ser Ile Tyr His Lys Tyr Ala Glu
 165 170 175
 Thr Phe Pro Trp Gly Gly Lys Leu Thr Gly Glu Ser Ile Lys Phe Phe
 180 185 190
 Ser Pro Leu Val Met Trp Thr Arg Phe Ser Ser Ser Lys Glu Lys His
 195 200 205
 Lys Ala Leu Phe Ser Ala Phe Leu Glu Tyr Tyr Gln Ala Trp Leu Glu
 210 215 220
 Met Thr Ile Gln Val Arg Glu Glu Met Glu Pro Ser His Val Arg Ala
 225 230 235 240
 Asn Cys Glu Ala Gln His Lys Tyr Leu Thr Trp Arg Ala Gln Lys Asp
 245 250 255
 Pro Gly His Gly Leu Leu Lys Arg Leu Val Gly Glu Ala Lys Ala Lys
 260 265 270
 Glu Leu Leu Arg Asp Phe Leu Phe Asn Gly Val Asp Glu Leu Gly Thr
 275 280 285
 Lys Thr Phe Ile Asp Tyr Phe Pro Glu Tyr Gln Thr Glu Asp Gly Thr
 290 295 300
 Val Ser Asp Lys Arg Ser Ile Ile Gly Lys Ser Tyr Glu Thr Arg Pro
 305 310 315 320
 Trp Asp Leu Thr Gly Gln Phe Ile Gly
 325

<210> 56
 <211> 319
 <212> PRT
 <213> Arapidopsis thaliana

<400> 56

Met Ala Met Ile Phe Cys Asn Thr Leu Tyr Ser Ser Ser Ser Pro Ser
1 5 10 15
Tyr Leu Ser Pro Leu Thr Ser Lys Pro Ser Arg Phe Ser Lys Asn Leu
20 25 30
Arg Pro Arg Ala Gln Phe Gln Ser Met Glu Asp His Asp Asp His Leu
35 40 45
Arg Arg Lys Phe Met Glu Phe Pro Tyr Val Ser Pro Thr Arg Lys Gln
50 55 60
Leu Met Val Asp Leu Met Ser Thr Val Glu Asn Arg Leu Gln Ser Gln
65 70 75 80
Leu Leu Pro Cys Asn Leu Pro Pro Asp Val Arg Asn Phe Asn Asn Pro
85 90 95
Asn Gly Ser Ala Glu Ala Ser Leu His Ile Arg Ser Gly Asp Lys Ser
100 105 110
Ser Pro Ile Asp Phe Val Ile Gly Ser Trp Ile His Cys Lys Ile Pro
115 120 125
Thr Gly Val Ser Leu Asn Ile Thr Ser Ile Ser Gly Phe Leu Asn Ser
130 135 140
Ser Thr Lys Ala Pro Asn Phe Val Val Glu Leu Ile Gln Ser Ser Ser
145 150 155 160
Lys Ser Leu Val Leu Ile Leu Asp Leu Pro His Arg Lys Asp Leu Val
165 170 175
Leu Asn Pro Asp Tyr Leu Lys Glu Tyr Tyr Gln Asp Thr Ala Leu Asp
180 185 190
Ser His Arg Gln Ser Leu Leu Lys Leu Pro Glu Val Asn Pro Tyr Val
195 200 205
Ser Pro Ser Leu Phe Val Arg Ser Ala Phe Ser Pro Thr Ala Ser Met
210 215 220
Leu Lys Ile Asp Ala Glu Glu Glu Asp Lys Leu Glu Glu Ile Leu Arg
225 230 235 240
Asp His Val Ser Pro Ala Ala Lys Glu Val Leu Glu Val Trp Leu Glu
245 250 255
Arg Cys Val Lys Glu Glu Glu Glu Lys Ile Val Val Gly Glu Glu Glu
260 265 270
Arg Met Glu Leu Glu Arg Arg Asp Lys Ser Phe Arg Arg Lys Ser Ile
275 280 285
Glu Asp Asp Leu Asp Leu Gln Phe Pro Arg Met Phe Gly Glu Glu Val
290 295 300
Ser Ser Arg Val Val His Ala Ile Lys Glu Ala Phe Gly Val Leu

305

310

315

<210> 57

<211> 205

<212> PRT

<213> Hordeum vulgare

<400> 57

Met Asp Phe Met Leu Gln Ser Ser Leu His Cys Lys Val Pro Asn Gly
 1 5 10 15

Ala Ile Asp Ile Thr Ser Leu Phe Ile Asn Leu Asn Ala Ser Thr Asp
 20 25 30

Ala Pro His Phe Ile Met Glu Phe Ile Gln Gly Ser Pro Thr Ser Met
 35 40 45

Val Val Leu Leu Asp Leu Leu Pro Arg Lys Asp Leu Ala Leu His Pro
 50 55 60

Glu Tyr Ile Glu Lys Tyr Tyr Glu Asp Thr Glu Val Asp Lys Gln Arg
 65 70 75 80

Lys Ile Ile Glu Gln Leu Pro Gln Ala Arg Pro Tyr Leu Ser Pro Ser
 85 90 95

Leu Phe Val Arg Ser Ala Phe Ser Pro Thr Ala Val Phe Phe Thr Ile
 100 105 110

Asp Cys Gly Lys Gly Gly Glu Gly Thr Leu Glu Glu Ile Val His Gly
 115 120 125

His Leu Ala Ser Val Val Lys Gly Ile Leu Gln Ile Trp Leu Asp Thr
 130 135 140

Cys Ala Ser Asp Ala Ser Glu Met Glu Glu Gly Glu Arg Glu Ile Met
 145 150 155 160

Val Lys Arg Asp Arg Thr Val Arg Ser Lys Ser Ile Glu Val Asp Leu
 165 170 175

Thr Ala Asn Leu Pro Arg Met Phe Gly Pro Asp Val Ser Gly Arg Ile
 180 185 190

Ile Ala Glu Ile Arg Lys Ala Phe Gly Val Gln Glu Gly
 195 200 205